

60020830-0003 sequence listing.txt
SEQUENCE LISTING

<110> wun, Tze-Chein
 <120> Novel Recombinant Anticoagulant Proteins
 <130> 60020830-0003
 <140> PCT/US03/17442
 <141> 2003-06-04
 <150> US 06/386,932
 <151> 2002-06-06
 <160> 41
 <170> PatentIn version 3.2
 <210> 1
 <211> 382
 <212> PRT
 <213> Artificial

<220>
 <223> Fusion protein: human-derived ANV with TAP
 <400> 1

Ala Tyr Asn Arg Leu Cys Ile Lys Pro Arg Asp Trp Ile Asp Glu Cys
 1 5 10 15

Asp Ser Asn Glu Gly Gly Glu Arg Ala Tyr Phe Arg Asn Gly Lys Gly
 20 25 30

Gly Cys Asp Ser Phe Trp Ile Cys Pro Glu Asp His Thr Gly Ala Asp
 35 40 45

Tyr Tyr Ser Ser Tyr Asn Asp Cys Phe Asn Ala Cys Ile Gly Ser Ala
 50 55 60

Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu Arg
 65 70 75 80

Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr Asp
 85 90 95

Glu Glu Ser Ile Leu Thr Leu Leu Thr Ser Arg Ser Asn Ala Gln Arg
 100 105 110

Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu Leu
 115 120 125

Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile Val
 130 135 140

60020830-0003 sequence listing.txt

Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys His
145 150 155 160

Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile Ile
165 170 175

Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr Glu
180 185 190

Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr Ser
195 200 205

Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg Asp
210 215 220

Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln Ala
225 230 235 240

Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys Phe
245 250 255

Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val Phe
260 265 270

Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile Asp
275 280 285

Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val Lys
290 295 300

Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr Ala
305 310 315 320

Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met Val
325 330 335

Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg Lys
340 345 350

Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser Gly
355 360 365

Asp Tyr Lys Lys Ala Leu Leu Leu Leu Ala Gly Glu Asp Asp
370 375 380

<210> 2
<211> 378

60020830-0003 sequence listing.txt

<212> PRT

<213> Artificial

<220>

<223> Fusion protein: human-derived ANV with artificial 6L15 (a variant of naturally-occurring bovine pancreatic trypsin inhibitor)

<400> 2

Ala Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu
 1 5 10 15

Arg Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr
 20 25 30

Asp Glu Glu Ser Ile Leu Thr Leu Thr Ser Arg Ser Asn Ala Gln
 35 40 45

Arg Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu
 50 55 60

Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile
 65 70 75 80

Val Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys
 85 90 95

His Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile
 100 105 110

Ile Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr
 115 120 125

Glu Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr
 130 135 140

Ser Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg
 145 150 155 160

Asp Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln
 165 170 175

Ala Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys
 180 185 190

Phe Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val
 195 200 205

Phe Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile
 210 215 220

60020830-0003 sequence listing.txt

Asp Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val
225 230 235 240

Lys Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr
245 250 255

Ala Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met
260 265 270

Val Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg
275 280 285

Lys Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser
290 295 300

Gly Asp Tyr Lys Lys Ala Leu Leu Leu Leu Ala Gly Glu Asp Asp Met
305 310 315 320

His Pro Asp Phe Cys Leu Glu Pro Pro Tyr Asp Gly Pro Cys Arg Ala
325 330 335

Leu His Leu Arg Tyr Phe Tyr Asn Ala Lys Ala Gly Leu Cys Gln Thr
340 345 350

Phe Tyr Tyr Gly Gly Cys Leu Ala Lys Arg Asn Asn Phe Glu Ser Ala
355 360 365

Glu Asp Cys Met Arg Thr Cys Gly Gly Ala
370 375

<210> 3
<211> 376
<212> PRT
<213> Artificial

<220>
<223> Fusion protein:human-derived ANV with synthetic human K-APP
<400> 3

Ala Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu
1 5 10 15

Arg Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr
20 25 30

Asp Glu Glu Ser Ile Leu Thr Leu Leu Thr Ser Arg Ser Asn Ala Gln
35 40 45

60020830-0003 sequence listing.txt

Arg Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu
50 55 60

Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile
65 70 75 80

Val Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys
85 90 95

His Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile
100 105 110

Ile Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr
115 120 125

Glu Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr
130 135 140

Ser Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg
145 150 155 160

Asp Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln
165 170 175

Ala Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys
180 185 190

Phe Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val
195 200 205

Phe Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile
210 215 220

Asp Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val
225 230 235 240

Lys Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr
245 250 255

Ala Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met
260 265 270

Val Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg
275 280 285

Lys Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser
290 295 300

60020830-0003 sequence listing.txt

Gly Asp Tyr Lys Lys Ala Leu Leu Leu Leu Ala Gly Glu Asp Asp Glu
305 310 315 320

Val Cys Ser Glu Gln Ala Glu Thr Gly Pro Cys Arg Ala Met Ile Ser
325 330 335

Arg Trp Tyr Phe Asp Val Thr Glu Gly Lys Cys Ala Pro Phe Phe Tyr
340 345 350

Gly Gly Cys Gly Gly Asn Arg Asn Asn Phe Asp Thr Glu Glu Tyr Cys
355 360 365

Met Ala Val Cys Gly Ser Ala Ile
370 375

<210> 4

<211> 459

<212> PRT

<213> Artificial

<220>

<223> Fusion protein: human-derived ANV with KK-TFPI (a human sequence)

<400> 4

Ala Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu
1 5 10 15

Arg Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr
20 25 30

Asp Glu Glu Ser Ile Leu Thr Leu Leu Thr Ser Arg Ser Asn Ala Gln
35 40 45

Arg Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu
50 55 60

Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile
65 70 75 80

Val Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys
85 90 95

His Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile
100 105 110

Ile Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr
115 120 125

60020830-0003 sequence listing.txt

Glu Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr
130 135 140

Ser Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg
145 150 155 160

Asp Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln
165 170 175

Ala Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys
180 185 190

Phe Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val
195 200 205

Phe Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile
210 215 220

Asp Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val
225 230 235 240

Lys Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr
245 250 255

Ala Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met
260 265 270

Val Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg
275 280 285

Lys Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser
290 295 300

Gly Asp Tyr Lys Lys Ala Leu Leu Leu Leu Ala Gly Glu Asp Asp Met
305 310 315 320

His Ser Phe Cys Ala Phe Lys Ala Asp Asp Gly Pro Cys Lys Ala Ile
325 330 335

Met Lys Arg Phe Phe Phe Asn Ile Phe Thr Arg Gln Cys Glu Glu Phe
340 345 350

Ile Tyr Gly Gly Cys Glu Gly Asn Gln Asn Arg Phe Glu Ser Leu Glu
355 360 365

Glu Cys Lys Lys Met Cys Thr Arg Asp Asn Ala Asn Arg Ile Ile Lys
370 375 380

60020830-0003 sequence listing.txt

Thr Thr Leu Gln Gln Glu Lys Pro Asp Phe Cys Phe Leu Glu Glu Asp
385 390 395 400

Pro Gly Ile Cys Arg Gly Tyr Ile Thr Arg Tyr Phe Tyr Asn Asn Gln
405 410 415

Thr Lys Gln Cys Glu Arg Phe Lys Tyr Gly Gly Cys Leu Gly Asn Met
420 425 430

Asn Asn Phe Glu Thr Leu Glu Glu Cys Lys Asn Ile Cys Glu Asp Gly
435 440 445

Pro Asn Gly Phe Gln Val Asp Asn Tyr Gly Thr
450 455

<210> 5
<211> 1149
<212> DNA
<213> Artificial

<220>
<223> Fusion gene of human-derived ANV with TAP

<400> 5
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ccggaagacc acaccggtgc tgactactac tcctcctaca acgactgctt caacgcttgc 180
atcggatccg cacaggttct cagaggcact gtgactgact tccctggatt tgatgagcgg 240
gctgatgcag aaactcttcg gaaggctatg aaaggcttgg gcacagatga ggagagcatc 300
ctgactctgt tgacatcccc aagtaatgct cagcgccagg aaatctctgc agcttttaag 360
actctgtttg gcagggatct tctggatgac ctgaaatcag aactaactgg aaaatttgaa 420
aaattaattg tggctctgat gaaaccctct cggctttatg atgcttatga actgaaacat 480
gccttgaagg gagctggaac aaatgaaaaa gtactgacag aaattattgc ttcaaggaca 540
cctgaagaac tgagagccat caaacaagtt tatgaagaag aatatggctc aagcctggaa 600
gatgacgtgg tgggggacac ttcagggtac taccagcgga tgttggtggt tctccttcag 660
gctaacagag accctgatgc tggaattgat gaagctcaag ttgaacaaga tgctcaggct 720
ttatttcagg ctggagaact taaatggggg acagatgaag aaaagtttat caccatcttt 780
ggaacacgaa gtgtgtctca tttgagaaag gtgtttgaca agtacatgac tatatcagga 840
tttcaaattg aggaaaccat tgaccgagag acttctggca atttagagca actactcctt 900
gctgttgtga aatctattcg aagtatacct gcctaccttg cagagaccct ctattatgct 960

60020830-0003 sequence listing.txt

atgaagggag ctgggacaga tgatcatacc ctcatcagag tcatggtttc caggagtga	1020
attgatctgt ttaacatcag gaaggagttt aggaagaatt ttgccacctc tctttattcc	1080
atgattaagg gagatacatc tggggactat aagaaagctc ttctgctgct cgctggagaa	1140
gatgactaa	1149

<210> 6
 <211> 1137
 <212> DNA
 <213> Artificial

<220>
 <223> Fusion gene of human-derived ANV with artificial 6L15, which is a variant of naturally occurring bovine pancreatic trypsin inhibitor

<400> 6	
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gaaactcttc ggaaggctat gaaaggcttg ggcacagatg aggagagcat cctgactctg	120
ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt	180
ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt	240
gtggctctga tgaaaccctc tcggctttat gatgcttatg aactgaaaca tgccttgaag	300
ggagctggaa caaatgaaaa agtactgaca gaaattattg cttcaaggac acctgaagaa	360
ctgagagcca tcaaacaagt ttatgaagaa gaatatggct caagcctgga agatgacgtg	420
gtgggggaca cttcagggta ctaccagcgg atgttggttg ttctccttca ggctaacaga	480
gaccctgatg ctggaattga tgaagctcaa gttgaacaag atgctcaggc tttatttcag	540
gctggagaac ttaaattggg gacagatgaa gaaaagttaa tcaccatctt tggaacacga	600
agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatatcagg atttcaaatt	660
gaggaaacca ttgaccgca gacttctggc aatttagagc aactactcct tgctgttgtg	720
aaatctattc gaagtatacc tgcctacctt gcagagaccc tctattatgc tatgaaggga	780
gctgggacag atgatcatac cctcatcaga gtcatggttt ccaggagtga gattgatctg	840
tttaacatca ggaaggagtt taggaagaat ttgtccacct ctctttattc catgattaag	900
ggagatacat ctggggacta taagaaagct cttctgctgc tcgctggaga agatgacatg	960
catccggact tctgcctgga accgccgtac gacgggtccgt gccgtgctct gcacctgcgt	1020
tacttctaca atgcaaaggc aggcctgtgt cagaccttct actacggcgg ttgcctggct	1080
aagcgtaaca acttcgaatc cgcggaagac tgcattgcgt cttgcggtgg tgcttaa	1137

<210> 7
 <211> 1131
 <212> DNA
 <213> Artificial

60020830-0003 sequence listing.txt

<220>

<223> Fusion gene of human-derived ANV with synthetic human K-APP gene

<400> 7

gcacaggttc tcagaggcac tgtgactgac ttccctggat ttgatgagcg ggctgatgca	60
gaaactcttc ggaaggctat gaaaggcttg ggcacagatg aggagagcat cctgactctg	120
ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt	180
ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt	240
gtggctctga tgaaaccctc tcggctttat gatgcttatg aactgaaaca tgccttgaag	300
ggagctggaa caaatgaaaa agtactgaca gaaattattg cttcaaggac acctgaagaa	360
ctgagagcca tcaaacaagt ttatgaagaa gaatatggct caagcctgga agatgacgtg	420
gtgggggaca cttcagggtg ctaccagcgg atgttggtgg ttctccttca ggctaacaga	480
gaccctgatg ctggaattga tgaagctcaa gttgaacaag atgctcaggc tttatttcag	540
gctggagaac ttaaatgggg gacagatgaa gaaaagttta tcaccatctt tggaacacga	600
agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatcaggc atttcaaatt	660
gaggaaacca ttgaccgcca gacttctggc aatttagagc aactactcct tgctgttgtg	720
aaatctattc gaagtatacc tgcctacctt gcagagacct tctattatgc tatgaaggga	780
gctgggacag atgatcatac cctcatcaga gtcattggtt ccaggagtga gattgatctg	840
tttaacatca ggaaggagtt taggaagaat ttgcccacct ctctttattc catgattaag	900
ggagatacat ctggggacta taagaaagct cttctgctgc tcgctggaga agatgacgag	960
gtttgttctg agcaagctga gactggcca ttagagacta tgatttctag atggtacttc	1020
gacgttactg agggtaagtg tgctccattc ttctacggtg gttgtggtgg taacagaaac	1080
aacttcgaca ctgaggagta ctgtatggct gtttgtggtt ctgctattta a	1131

<210> 8

<211> 1380

<212> DNA

<213> Artificial

<220>

<223> Fusion gene of human-derived ANV with KK-TFPI, which is a human sequence

<400> 8

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ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt	180
ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt	240
gtggctctga tgaaaccctc tcggctttat gatgcttatg aactgaaaca tgccttgaag	300

60020830-0003 sequence listing.txt

ggagctggaa caaatgaaaa agtactgaca gaaattattg cttcaaggac acctgaagaa	360
ctgagagcca tcaaacaagt ttatgaagaa gaatatggct caagcctgga agatgacgtg	420
gtgggggaca cttcagggtg ctaccagcgg atgttggtgg ttctccttca ggctaacaga	480
gaccctgatg ctggaattga tgaagctcaa gttgaacaag atgctcaggc tttatttcag	540
gctggagaac ttaaattgggg gacagatgaa gaaaagttaa tcaccatctt tggaacacga	600
agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatatcagg atttcaaatt	660
gaggaaacca ttgaccgca gacttctggc aatttagagc aactactcct tgctgttgtg	720
aaatctattc gaagtatacc tgcctacctt gcagagaccc tctattatgc tatgaaggga	780
gctgggacag atgatcatac cctcatcaga gtcattggtt ccaggagtga gattgatctg	840
tttaacatca ggaaggagt taggaagaat ttgtccacct ctctttattc catgattaag	900
ggagatacat ctggggacta taagaaagct cttctgctgc tcgctggaga agatgacatg	960
cattcatttt gtgcattcaa ggcggatgat ggcccatgta aagcaatcat gaaaagattt	1020
ttcttcaata ttttctctg acagtgcgaa gaatttatat atgggggatg tgaaggaaat	1080
cagaatcgat ttgaaagtct ggaagagtgc aaaaaaatgt gtacaagaga taatgcaaac	1140
aggattataa agacaacatt gcaacaagaa aagccagatt tctgcttttt ggaagaagat	1200
cctggaatat gtcgaggtta tattaccagg tatttttata acaatcagac aaaacagtgt	1260
gaacgtttca agtatggtgg atcgtggggc aatatgaaca attttgagac actggaagaa	1320
tgcaagaaca tttgtgaaga tgggccgaat ggtttccagg tggataatta tggaacctaa	1380

<210> 9
 <211> 960
 <212> DNA
 <213> Homo sapiens

<400> 9	
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gaaactcttc ggaaggctat gaaaggcttg ggcacagatg aggagagcat cctgactctg	120
ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt	180
ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt	240
gtggctctga tgaaaccctc tcggctttat gatgcttatg aactgaaaca tgccttgaag	300
ggagctggaa caaatgaaaa agtactgaca gaaattattg cttcaaggac acctgaagaa	360
ctgagagcca tcaaacaagt ttatgaagaa gaatatggct caagcctgga agatgacgtg	420
gtgggggaca cttcagggtg ctaccagcgg atgttggtgg ttctccttca ggctaacaga	480
gaccctgatg ctggaattga tgaagctcaa gttgaacaag atgctcaggc tttatttcag	540
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60020830-0003 sequence listing.txt

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agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatatacagg atttcaaatt 660
gaggaaacca ttgaccgcga gacttctggc aatttagagc aactactcct tgctgtttgtg 720
aaatctattc gaagtatacc tgcctacctt gcagagaccc tctattatgc tatgaaggga 780
gctgggacag atgatcatac cctcatcaga gtcatggttt ccaggagtga gattgatctg 840
tttaacatca ggaaggagtt taggaagaat ttgtccacct ctctttattc catgattaag 900
ggagatacat ctggggacta taagaaagct cttctgctgc tctgtggaga agatgactaa 960

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<210> 10
<211> 319
<212> PRT
<213> Homo sapiens

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<400> 10

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Ala Gln Val Leu Arg Gly Thr Val Thr Asp Phe Pro Gly Phe Asp Glu
1          5          10          15

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Arg Ala Asp Ala Glu Thr Leu Arg Lys Ala Met Lys Gly Leu Gly Thr
          20          25          30

```

```

Asp Glu Glu Ser Ile Leu Thr Leu Thr Ser Arg Ser Asn Ala Gln
          35          40          45

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```

Arg Gln Glu Ile Ser Ala Ala Phe Lys Thr Leu Phe Gly Arg Asp Leu
          50          55          60

```

```

Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys Phe Glu Lys Leu Ile
65          70          75          80

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Val Ala Leu Met Lys Pro Ser Arg Leu Tyr Asp Ala Tyr Glu Leu Lys
          85          90          95

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```

His Ala Leu Lys Gly Ala Gly Thr Asn Glu Lys Val Leu Thr Glu Ile
          100          105          110

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```

Ile Ala Ser Arg Thr Pro Glu Glu Leu Arg Ala Ile Lys Gln Val Tyr
          115          120          125

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```

Glu Glu Glu Tyr Gly Ser Ser Leu Glu Asp Asp Val Val Gly Asp Thr
          130          135          140

```

```

Ser Gly Tyr Tyr Gln Arg Met Leu Val Val Leu Leu Gln Ala Asn Arg
          145          150          155          160

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Asp Pro Asp Ala Gly Ile Asp Glu Ala Gln Val Glu Gln Asp Ala Gln
          165          170          175

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60020830-0003 sequence listing.txt

Ala Leu Phe Gln Ala Gly Glu Leu Lys Trp Gly Thr Asp Glu Glu Lys
180 185 190

Phe Ile Thr Ile Phe Gly Thr Arg Ser Val Ser His Leu Arg Lys Val
195 200 205

Phe Asp Lys Tyr Met Thr Ile Ser Gly Phe Gln Ile Glu Glu Thr Ile
210 215 220

Asp Arg Glu Thr Ser Gly Asn Leu Glu Gln Leu Leu Leu Ala Val Val
225 230 235 240

Lys Ser Ile Arg Ser Ile Pro Ala Tyr Leu Ala Glu Thr Leu Tyr Tyr
245 250 255

Ala Met Lys Gly Ala Gly Thr Asp Asp His Thr Leu Ile Arg Val Met
260 265 270

Val Ser Arg Ser Glu Ile Asp Leu Phe Asn Ile Arg Lys Glu Phe Arg
275 280 285

Lys Asn Phe Ala Thr Ser Leu Tyr Ser Met Ile Lys Gly Asp Thr Ser
290 295 300

Gly Asp Tyr Lys Lys Ala Leu Leu Leu Leu Cys Gly Glu Asp Asp
305 310 315

<210> 11
<211> 33
<212> DNA
<213> Artificial

<220>
<223> ANV reverse primer

<400> 11
atcaagctta tgcattgtcat cttctccaca gag

33

<210> 12
<211> 31
<212> DNA
<213> Artificial

<220>
<223> ANV forward primer

<400> 12
gatcggatcc agtctggtcc tgcttcacct t

31

<210> 13

60020830-0003 sequence listing.txt

<211> 32
<212> DNA
<213> Artificial

<220>
<223> Synthetic oligonucleotide used to generate ANV cDNA mutation of Cys-to-Ala at position 315

<400> 13
cgtgacatgc atgtcatctt ctccagcgag ca 32

<210> 14
<211> 960
<212> DNA
<213> Artificial

<220>
<223> Sequence encoding human ANV with Cys-to-Ala mutation at position 315

<400> 14
gcacagggttc tcagaggcac tgtgactgac ttccctggat ttgatgagcg ggctgatgca 60
gaaactcttc ggaaggctat gaaaggcttg ggcacagatg aggagagcat cctgactctg 120
ttgacatccc gaagtaatgc tcagcgccag gaaatctctg cagcttttaa gactctgttt 180
ggcagggatc ttctggatga cctgaaatca gaactaactg gaaaatttga aaaattaatt 240
gtggctctga tgaaaccctc tcggctttat gatgcttatg aactgaaaca tgccttgaag 300
ggagctggaa caaatgaaaa agtactgaca gaaattattg cttcaaggac acctgaagaa 360
ctgagagcca tcaaacaagt ttatgaagaa gaatatggct caagcctgga agatgacgtg 420
gtgggggaca cttcagggta ctaccagcgg atgttggttg ttctccttca ggctaacaga 480
gaccctgatg ctggaattga tgaagctcaa gttgaacaag atgctcaggc tttatttcag 540
gctggagaac ttaaattggg gacagatgaa gaaaagttaa tcaccatctt tggaacacga 600
agtgtgtctc atttgagaaa ggtgtttgac aagtacatga ctatatcagg atttcaaatt 660
gaggaaacca ttgaccgca gacttctggc aatttagagc aactactcct tgctgttgtg 720
aaatctattc gaagtatacc tgcctacctt gcagagaccc tctattatgc tatgaaggga 780
gctgggacag atgatcatac cctcatcaga gtcattggtt ccaggagtga gattgatctg 840
tttaacatca ggaaggagtt taggaagaat ttgcccacct ctctttattc catgattaag 900
ggagatacat ctggggacta taagaaagct cttctgctgc tcgctggaga agatgactaa 960

<210> 15
<211> 64
<212> DNA
<213> Artificial

<220>
<223> Synthetic oligonucleotide, first of three forward primers used to generate recombinant 6L15 gene

60020830-0003 sequence listing.txt

<400> 15
tccggacttc tgcctggaac cgccgtacga cgggccgtgc cgtgctctgc acctgcgtta 60
cttc 64

<210> 16
<211> 60
<212> DNA
<213> Artificial

<220>
<223> Synthetic oligonucleotide, second of three forward primers used to generate recombinant 6L15

<400> 16
tacaatgcaa aggcaggcct gtgtcagacc ttctactacg gcggttgcct ggctaagcgt 60

<210> 17
<211> 50
<212> DNA
<213> Artificial

<220>
<223> Synthetic oligonucleotide, third of three forward primers used to generate recombinant 6L15 gene

<400> 17
aacaacttcg aatccgcgga aactgcatg cgtacttgcg gtggtgctta 50

<210> 18
<211> 63
<212> DNA
<213> Artificial

<220>
<223> Synthetic oligonucleotide, first of three reverse primers used to generate recombinant 6L15 gene

<400> 18
acgcaggtgc agagcacggc acggaccgtc gtacggcggc tccaggcaga agtccggatg 60
cat 63

<210> 19
<211> 60
<212> DNA
<213> Artificial

<220>
<223> Synthetic oligonucleotide, second of three reverse primers used to generate recombinant 6L15 gene

<400> 19
agccaggcaa ccgccgtagt agaaggtctg acacaggcct gcctttgcat tgtagaagta 60

<210> 20
<211> 60

60020830-0003 sequence listing.txt

<212> DNA
<213> Artificial

<220>
<223> Synthetic oligonucleotide, third of three reverse primers used to generate recombinant 6L15 gene

<400> 20
agcttaagca ccaccgcaag tacgcatgca gtcttccgcg gattcgaagt tgttacgctt 60

<210> 21
<211> 177
<212> DNA
<213> Artificial

<220>
<223> synthetic 6L15 gene

<400> 21
gctccggact tctgcctgga accgccgtac gacgggtccgt gccgtgctct gcacctgcgt 60
tacttctaca atgcaaaggc aggcctgtgt cagaccttct actacggcgg ttgcctggct 120
aagcgtaaca acttcgaatc cgcggaagac tgcattgcgt cttgcggtgg tgcttaa 177

<210> 22
<211> 186
<212> DNA
<213> Artificial

<220>
<223> Synthetic, derived from Ornithodoros moubata gene

<400> 22
gcttacaacc gtctgtgcat caaaccgcgt gactggatcg acgaatgcga ctccaacgaa 60
gggtgtgaac gtgcttactt ccgtaacggt aaaggtgggt gcgactcctt ctggatctgc 120
ccggaagacc acaccggtgc tgactactac tcctcctacc gtgactgctt caacgcttgc 180
atctaa 186

<210> 23
<211> 122
<212> DNA
<213> Artificial

<220>
<223> Forward synthetic oligonucleotide for generating synthetic K-APP gene with flanking sequences

<400> 23
ggccctaccc cacagatacg gagttgccac cactgaaact tgaggttggt agagaggttt 60
gttctgagca agctgagact ggtccatgta gagctatgat ttctagatgg tacttcgacg 120
tt 122

<210> 24

60020830-0003 sequence listing.txt

<211> 117
<212> DNA
<213> Artificial

<220>
<223> Forward synthetic oligonucleotide for generating synthetic K-APP gene with flanking sequences

<400> 24
actgagggta agtgtgctcc attcttctac ggtgggttggtg gtggtaacag aaacaacttc 60
gacactgagg agtactgtat ggctgtttgt ggttctgcta tttaaagca ttgatga 117

<210> 25
<211> 124
<212> DNA
<213> Artificial

<220>
<223> Reverse synthetic oligonucleotide for generating synthetic K-APP gene with flanking sequences

<400> 25
ctcagtaacg tcgaagtacc atctagaaat catagctcta catggaccag tctcagcttg 60
ctcagaacaa acctctctaa caacctcaag tttcagtgggt ggcaactccg tatctgtggg 120
gtag 124

<210> 26
<211> 115
<212> DNA
<213> Artificial

<220>
<223> Reverse synthetic oligonucleotide for generating synthetic K-APP gene with flanking sequences

<400> 26
agcttcatca atgcatttaa atagcagaac cacaacagc catacagtac tcctcagtggt 60
cgaagttggt tctgttacca ccacaaccac cgtagaagaa tggagcacac ttacc 115

<210> 27
<211> 174
<212> DNA
<213> Artificial

<220>
<223> Synthetic K-APP gene, derived from human squence

<400> 27
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ttcgacgtta ctgagggtaa gtgtgctcca ttcttctacg gtgggttggtg tggtaacaga 120
aacaacttcg aactgagga gtactgtatg gctgtttgtg gttctgctat ttaa 174

<210> 28

60020830-0003 sequence listing.txt

<211> 30
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 28
ggaattccat atggcacagg ttctcagagg

30

<210> 29
<211> 24
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 29
ccaatgcatg tcattcttc cagc

24

<210> 30
<211> 24
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 30
ccaatgcatc cggacttctg cctg

24

<210> 31
<211> 24
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 31
ccaatgcatt cattttgtgc attc

24

<210> 32
<211> 27
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 32
acgcgtcgac ttaagcacca ccgcaag

27

<210> 33
<211> 29
<212> DNA
<213> Artificial

60020830-0003 sequence listing.txt

<220>
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 <400> 33
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<210> 34
 <211> 30
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 34
 ggaattccat atggcttaca accgtctgtg 30

<210> 35
 <211> 27
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 35
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<210> 36
 <211> 26
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 36
 cgggatccgc acaggttctc agaggc 26

<210> 37
 <211> 29
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 37
 acgcgtcgac ttagtcatct tctccagcg 29

<210> 38
 <211> 31
 <212> DNA
 <213> Artificial

<220>
 <223> Primer designed for generating PCR fragment of interest for
 Page 19

60020830-0003 sequence listing.txt
cloning into vector pPIC9

<400> 38
ccgctcgaga aaagagcaca ggttctcaga g 31

<210> 39
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Primer designed for generating PCR fragment of interest for
cloning into yeast expression vector pPIC9

<400> 39
ataagaatgc ggccgcttaa atagcagaac cac 33

<210> 40
<211> 24
<212> DNA
<213> Artificial

<220>
<223> Primer designed for generating PCR fragment of interest for
cloning into yeast expression vector pPIC9

<400> 40
cgcgatatca tcttctccag cgag 24

<210> 41
<211> 20
<212> DNA
<213> Artificial

<220>
<223> Primer designed for generating PCR fragment of interest for
cloning into yeast expression vector pPIC9

<400> 41
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